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Original Research Article

Factors Affecting Gross Return of Binadhan-11 Produced At Different Districts of Bangladesh

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Abstract

The study was conducted in five major Binadhan-11 growing areas of Bangladesh, namely Mymensingh, Sherpur, Jamalpur and Kurigram. The sample farmers were profitable to cultivate Binadhan-11 in the study area. Cobb-Douglas production function was applied for estimating the Binadhan-11 production function which implied the factors affecting with respect to labor and seedling cost that were positive values at Mymensingh, Sherpur and Jamalpur district respectively. Fertilizer, insecticide and power tiller that were positive values of 0.233, 0.121 and 0.234 and also significant. The reasons that hamper the achievement of goals are defined as problems whereas suggestions are indications of some measures to overcome these problems. The Binadhan-11 producers faced some major problems such as the scarcity of farm labour and high wage rate, adulterated fertilizer and insecticide, short supply and high price of fertilizers, lack of credit facilities, transportation problem, and lack of adequate market information in the study area.

Keywords: Factors, Regression, Coefficient and Problems.

INTRODUCTION

Agricultural development in an agrarian economy largely depends on the existing nature of man-land relationship. According to Bishop and Toussaint [1] both land lord and tenant are utilizing inputs belonging to other party. The focus of this study is to measure the factors affecting gross return of Binadhan-11 growing farmers. In Bangladesh most of the farmers are not used their inputs efficiently. They also affect the degree of uncertainty encountered in the operation of a farm. At present only 5, 18 and 13% of rice, wheat and jute seeds respectively are supplied from recognized seed companies and the rest of the seeds are available from farmers' sources [2]. Cost effectiveness of rice seed production is most important in rice cultivation by which a farmer feels interested to produce more rice seed for his economic development. By 2050, global population is expected to reach 9.6 billion [3]. As a result, the consumption of staple cereals, including rice, wheat, maize, as well as fish and meat products is expected to increase dramatically- particularly in rapidly developing countries [4]. To ensure cereal food security alone in 2050, more than a doubling of production is required [5]. This situation is complicated by the anticipated strain on global cropland availability, resulting in calls to intensify production on available land in order to avoid natural land.

From the economic point of view, if the farmers get minimum 1:1.50 taka for every taka of investment then it seems to be cost effective and the benefit is economically acceptable [6]. Like the basic inputs viz. seed, fertilizers, pesticides, irrigation and appropriate management, apart from socio-economic factors, may also influence the effectiveness of rice seed production at farmer's level. The socio-economic factors usually influence farmers' decisions as to which crop/variety is to be grown, which enterprise is to be run and so on. There are some socio-economic factors, having influences even on the particular crop production practice are to be followed, which might have significant impact on crop yield and productivity. Farm size, farmers` education level, technical knowledge of the farmers, training and farming experience etc. may have positive relationship with crop yield. The factors like farmers low income, lack of personal and interpersonal communication skill, less exposure to media etc. might have negative relationship with crop yield and productivity. Different socio-economic factors like education level, farming experience, farm size, linking with GO/NGOs, annual income etc. plays a significant role in the adoption process of modern agricultural technologies among the farmers. Moreover, the success of modern agriculture is

dependent on the farmers' knowledge and experience along with available inputs. In view of the above, this study was conducted to achieve i) to examine the factors affecting gross return of Binadhan-11 produced different districts; and ii) to identify the major problem faced by the Binadhan-11grower farmers.

MATERIALS AND METHOD

The study was conducted in five major Binadhan-11 growing areas of Bangladesh, namely Mymensingh, Sherpur, Jamalpur and Kurigram. A total of 120 farmers were randomly selected as sample size by using multistage sampling method in the study area, 30 from each District. Data were collected from Binadhan-11 growers through interview schedule. Some descriptive statistics were used for analyzing the collected data.

The specification of the Cobb-Douglas production function was as follows:

$Yi = aX_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} e^{ui}$

Where,

ln = Natural logarithm;

Y_i = Gross return (Kg/ha);

X_1= labor cost (Man days/ha);

X_2= Seedling cost (Kg/ha);

X_3= Fertilizer cost (Kg/ha);

X_4= Insecticide cost (Kg/ha);

X_5= Power tiller cost (Tk/ha);

a = Constant or intercept term;

b_1, b_2, b_3, b_4, b_5 = production coefficient of the respective input variable to be estimated; and

u_i= error term

RESULTS AND DISCUSSION

Multiple regression analysis was done to determine the influence of various characteristics of the respondents on the dependent variable i.e. profitability of rice seed production. In the present study, regression analysis was employed to determine the influence of the independent variables on the dependent variable both individually and jointly.

Findings from a log-linear specification are measured in table 1 the estimated Cobb-Douglas production function for Mymensingh was:

$$\ln Y_1 = 5.983 + 0.235 \ln X_1 + 0.301 \ln X_2 + 0.125 \ln X_3 + 0.184 \ln X_4 + 0.208 \ln X_5$$

The contribution of selected factors to production and returns from component can be examined from the individual regression co-efficient, which is discussed below.

Labour cost (X_1)

The regression coefficients for Binadhan-11 component under Mymensingh, Kurigram, Sherpur and Jamalpur districts implying that the one percent increase in the labour use cost increase the gross return from rice by 0.235, 0.086, 0.0258 and 0.315 percent, respectively. The coefficient of Mymensingh and Sherpur districts are significant at five percent and Jamalpur district is one percent level of significance which also indicated the over use of labour in the farming activities.

Seedling cost (X_2)

It is shown from the results presented in table 8 that the coefficient of seedling cost of the Binadhan-11 production was statistically significant at 1 percent level of significance for first Mymensingh district. The result implies that 1 percent increase in the seedling cost for Mymensingh district, keeping other factors constant, would result in an increase in gross return from rice by 0.301 percent. The coefficient of seedling cost of the rice production was statistically significant at 5 percent level of significance for next three districts. The result implies that 5 percent increase in the seedling cost for Mymensingh, Kurigram, Sherpur and Jamalpur districts farming systems, keeping other factors constant, would result in an increase in gross return from rice by 0.231, 0.236 and 0.254 percent, respectively.

Fertilizer cost (X_3)

From the table 1, the coefficient of fertilizer cost for Binadhan-11 component under Mymensingh, Kurigram, Sherpur and Jamalpur districts were positive and statistically significant for Kurigram district. The result implies that 1 percent increase in the fertilizer cost, keeping other factors constant, would result in an increase in gross return from Binadhan-11 by 0.125, 0.233, 0.253 and 0.263 percent, respectively.

Table-1: Estimated values of co-efficient and related Statistics of factors affecting gross return of Binadhan-11 produced different districts

Independent variable cost	Districts							
	Mymensingh	T value	Kurigram	T value	Sherpur	T value	Jamalpur	T value
Intercept	5.983 (1.203)	-	5.575 (1.054)	-	6.733 (1.174)	-	7.584 (1.528)	-
Labour cost (X_1)	0.235** (0.110)	2.136	0.086 (0.076)	1.123	0.258** (0.090)	2.861	0.315*** (0.096)	3.292
Seedling cost (X_2)	0.301*** (0.085)	3.561	0.231** (0.094)	2.445	0.236** (0.108)	2.192	0.254** (0.103)	2.456
Fertilizer cost (X_3)	0.125 (0.080)	1.560	0.233** (0.093)	2.515	0.253 (0.175)	1.439	0.263 (0.191)	1.379
Insecticides cost (X_4)	0.184 (0.153)	1.201	0.196 (0.156)	1.256	0.121** (0.047)	2.589	0.054 (0.048)	1.112

Power tiller (X_5)	0.208 (0.150)	1.386	0.234*** (0.075)	3.105	0.225 (0.166)	1.355	0.186 (0.131)	1.415
R^2	0.780		0.758		0.727		0.857	
Adjusted R^2	0.650		0.688		0.653		0.715	
Return to scale	1.015		1.136		1.178		1.252	
F - value	8.95***		9.23***		9.67***		11.32***	

Source: Field survey, 2016

Note: Figures in the parentheses indicate standard error.
*** Significant at 1 percent level
** Significant at 5 percent level
* Significant at 10 percent level

Insecticides cost (X_4)

The estimated results presented in table 8 shows that the coefficient of using insecticides cost were positive and statistically significant at 5 percent level of significance for Sherpur district. The other coefficient for Mymensingh, Kurigram, Sherpur and Jamalpur districts were positive as 0.184, 0.196, 0.121 and 0.054 percent, respectively were not significant.

Power tiller (X_5)

It is shown from the results presented in table 1 that the coefficient of power tiller cost for the production of rice was not statistically significant for Mymensingh, Kurigram, Sherpur and Jamalpur districts as they were 0.208, 0.234, 0.225 and 0.186 percent, respectively. The result for Kurigram district implies that 1 percent increase in the irrigation cost, keeping other factors constant, would result in an increase in gross return from rice by 0.234 percent which was statistically significant at 1 percent level of significance.

R^2 and Adjusted R^2

As it is evident from table 1 that the value of the co-efficient of multiple. determination R^2 of farming systems Mymensingh, Kurigram, Sherpur and Jamalpur districts were 0.780, 0.758, 0.727 and 0.857 respectively indicating that 78.0, 75.8, 72.7 and 85.7 percent, respectively of the variation in gross returns of rice production are explained by the independent variables included in the model.

Return to Scale

The return to scale is 1.015, 1.136, 1.178 and 1.252 which were the sum of elasticities as shown in table 3. This value being greater than 1 means that the farmers are operating at the region of increasing return to scale.

Problems and Constraints of Farmers and Its Probable Solutions

The reasons that hamper the achievement of goals are defined as problems whereas suggestions are indications of some measures to overcome these problems. The farmers faced various problems which are discussed below:

Scarcity of farm labour and high wage rate

Though the labourers are available in Bangladesh but most of them are unskilled and in the peak period the required labour was not available in the study area. In the farms most of the labourers, were totally illiterate. They did not help in scientific way, which reduce wastage in the production process. About 72, 61, 65 and 80 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively claimed this problem in the study area. All most 70 percent the farmers reported this problem on an average. To overcome this problem, the mechanization system should be developed.

Table-2: Major problems faced by the farmers under different districts

Name of the problems	Districts				
	Sherpur (%)	Jamalpur (%)	Kurigram (%)	Mymensingh (%)	Average (%)
Scarcity of farm labour and high wage rate	72	61	65	80	69.50
Adulterated fertilizer and insecticide	75	75	80	65	73.75
Short supply and High price of fertilizers	85	80	90	95	87.50
Lack of credit facilities	80	70	75	80	76.25
Transportation problem	55	62	85	57	64.75
Lack of adequate market information	65	65	70	50	62.50

Source: Field survey, 2016

Adulterated fertilizers and insecticides

The effectiveness of the used fertilizers and insecticides were very lower in quality said by almost all the respondents in the following study. Sometimes the adulteration rate was very much higher in fertilizers and insecticides that the farmers had to face the loss cultivation of Binadhan-11. About 75, 75, 80 and 65 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported that the fertilizers were adulterated. To solve this problem, govt.

should take to implement the law and order properly by law enforcement agencies.

Short supply and high price of fertilizers

Fertilizers were the important inputs in rice production. That's why the price hike in fertilizers was very much burning issue to be discussed by the farmers as they were interviewed. About 85, 80, 90 and 95 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported this problem. On an average about 88 percent farmers reported this problem as one of the major problems. The government should take initiative to higher subsidy and proper maintenance of supply and market channel to solve this problem.

Lack of credit facilities

Working capital is an important factor for the farmers. Most of the farmers reported that they suffered from shortage of necessary capital during the period of full operation. Due to shortage of working capital the farmers could not purchase necessary inputs in a large volume to meet up their demand in lean period. In the study area, About 85, 70, 75 and 80 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported this problem. The govt. and NGOs should take initiative to increase the credit facilities for the farmers.

Transportation problem

The transportation problems were different for different modes of transportation as well as for different market locations. Transportation problem becomes serious in the peak period of Aman and Boro seasons. The transportation cost is higher in those seasons compare to rest of the year. In the study area, on an average 65 percent farmers reported this problem. This problem can be solved by the ministry of LGRD and co-operatives to implement the proper steps.

Lack of adequate market information

Lack of adequate market information was a problem for the farmers. The farmers could not collect market information rapidly due to shortage of support service from the government. The percentage of the farmers were 65, 65, 70 and 50 for Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported about this problem and the average shows that 63 percent farmers of all farming systems reported this kind of problem. Adequate market information should be developed by media and other informants.

Other Problems

Besides the problems, which are discussed above, the farmers have to face some risk and uncertainties, which sometimes causes severe losses. These risks may arise due to various internal and external activities such as inadequate irrigation facilities Lack of technical knowledge, Homestead and village erosion vulnerability.

CONCLUSION

It is evident from the above-mentioned discussion that the sample farmers were profitable to cultivate Binadhan-11 in the study area. But some problems and factors were influenced throughout the production process. If the farmers become more conscious and modern implements are used in agricultural production activities, they will get maximum benefit to cultivation of Binadhan-11.

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Conflict of Interest

This manuscript is original and contains not any published material. The corresponding author confirms that all of the others authors have read and approved the manuscript and thus declare no conflicts of interest.

Author's Contributions

Syful Islam: Contributed in designing and performing the experiments, samples analysis, data analysis, manuscript writing and the manuscript reviewing all through the publication process.

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Equally contributed in designing the experiments, data collection, data entry and reviewing during the publication process

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